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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,198	10/28/2003	Chien-Ping Huang	60173(71987)	7288

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EXAMINER	
TRINH, HOA B	

ART UNIT	PAPER NUMBER
2814	

MAIL DATE	DELIVERY MODE
10/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/696,198	HUANG, CHIEN-PING	
	Examiner	Art Unit	
	(Vikki) Hoa B. Trinh	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09/27/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09/27/2007 has been entered.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-4, and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ku (US 2004/0099945)

Ku discloses a multi-chip package device with a heat sink 50 (fig. 4), comprising a chip carrier 10 (fig.4); at least one first chip 30 (fig. 4) or 31 (fig. 4) mounted on and electrically connected to a surface of the chip carrier 10; at least one semiconductor package 20 (fig. 4) mounted on and electrically connected to the surface of the chip carrier 10 (fig. 4); wherein the package 20 appears to be "slightly" thicker than the first chip 30 or 31 (fig. 4) (note that the examiner broadly interprets the term "slightly" since it does not denote a definite dimension) and the heat sink 50 (fig. 4) mounted via an adhesion layer (page 4, [0061], lines 3-5) on a surface of the first chip 30, 31 (fig. 4) and a surface of the semiconductor package 20 (fig. 4) that are opposite to surfaces of the first chip 30, 31 (fig. 4) and the semiconductor package 20 mounted on the chip carrier 10 (fig. 4). The at least one hollow part 504 (fig. 4) extending through the heat sink 50 is formed at an area of the heat sink free of contact with the first chip and the semiconductor package to release thermal stresses from the heat sink through the at least one hollow part that remains hollow.

However, Ku does not explicitly teach that a portion of the heat sink attached to the first chip is made thicker than another portion of the heat sink mounted on the semiconductor package

and that the size of the hollow part is adjusted depending on the thickness of the heat sink to effectively release the thermal stresses from the heat sink.

Nevertheless, it would have been obvious to one of ordinary skills in the art at the time the invention was made to construct the at least one hollow aperture of Ku with the portion of the heat sink attached to the first chip being made thicker than another portion of the heat sink mounted on the package, since it is a prima facie obvious to an artisan for optimization and experimentation to set different thickness dimensions of the heat sink on the device because applicants have not yet established any criticality or unexpected result for the different thickness dimensions of the heat sink. Also, applicants' claimed result is predictable. With respect to the size of the hollow part, the result is predictable because when the thickness of the heat sink changes, it also changes the size of the hollow part.

Note: Normally it is to be expected that a change in temperature, or in thickness, or in time, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art...such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller 105 USPQ233, 255 (CCPA 19553.

As to claim 2, Ku teaches that the semiconductor package 20 (fig. 4) is a flip-chip ball grid array package (specification, page 1, [0004]).

As to claim 3, Ku teaches that the first chip 30 or 31 (fig. 4) is capable of being a graphic

chip.

As to claim 4, Ku teaches that the first chip 30 or 31 (fig. 4) is capable of being a graphic processing unit.

As to claim 6, Ku teaches that the first chip 30 or 31 (fig. 4) is mounted at the center of the chip carrier 10 (fig. 4), and the semiconductor package 20 is mounted at a position on the chip carrier 10 corresponding to a corner of the heat sink 50.

As to claim 7, Ku teaches that at least one pair of the semiconductor packages 20 (fig.4) are mounted on the chip carrier 10 (fig. 4), and the hollow part 504 (fig. 4) of the heat sink 50 (fig. 4) is located between the semiconductor packages.

As to claim 8, at least one symmetrical pair (fig. 4) of the hollow parts 504 (fig. 4) are formed through the heat sink 24(fig.4).

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ku in view of Chee et al. (2003/0089977; hereinafter as Chee).

Ku discloses the invention substantially as claimed. However, Ku does not explicitly teach that the semiconductor package is a Random Access Memory (RAM) unit.

Chee discloses an analogous multi-chips BGA package (fig. 3b) having a carrier 314, and chips 311, 312, 313 (fig. 3b), wherein the package includes a RAM unit (paragraph [0023]).

Therefore, it would have been obvious to one of ordinary skills in the art at the time the invention was made to construct the package for multi-chips of Ku to include a RAM unit, as taught by Chee, for reducing packaging cost (paragraph [0013]).

Response to Arguments

6. Applicant's arguments filed 09/27/2007 (08/28/2007) have been fully considered but they are not persuasive.

In the remarks, applicants argue that Ku does not teach the newly amended portion in claim 1. Applicants cite paragraph [0050] from the reference stating that the aperture is for accommodating the chips, thereby not being adjusted to a size change when the thickness of the heat sink changes. The examiner disagrees, because the cited paragraph in Ku merely states the heat sink 50 "can include" at least an aperture to accommodate chips". Ku doesn't imply or explicitly teach that all of the apertures 504 of the heat sink 50 shown are used for accommodating the respective chips on the device. In fact, contrary to applicants' argument, figure 4 shows the apertures being offset from the chips 30 and 31, thereby not being overlapped the chips 30, 31. Furthermore, aside from figure 4, Ku continues to show his invention that the apertures 504 are offset from the chips (see figures 8-10) even in different embodiments. Thus, Ku anticipates the limitation of claim 1 as claimed. Claims 2-8 fall with claim 1.

With respect to claim 6, Ku shows the layer 10 is a carrier and layer 20 is the semiconductor package. The relationship of the carrier with respect to the package and the heat sink are met, as stated in the above. Applicants' allegation of the reference number "10" for the package was simply a typo.

For the foregoing reasons, applicants still have not overcome the cited references.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Vikki Trinh whose telephone number is (571) 272-1719. The Examiner can normally be reached from Monday-Friday, 9:00 AM - 5:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Mr. Wael Fahmy, can be reached at (571) 272-1705. The office fax number is 703-872-9306.

8. Any request for information regarding to the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Also, status information for published applications may be obtained from either Private PAIR or Public Pair. In addition, status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. If you have questions pertaining to the Private PAIR system, please contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

9. Lastly, paper copies of cited U.S. patents and U.S. patent application publications will cease to be mailed to applicants with Office actions as of June 2004. Paper copies of foreign patents and non-patent literature will continue to be included with office actions. These cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site (www.uspto.gov), from the Office of Public Records and from commercial sources. Applicants are referred to the Electronic Business Center (EBC) at http://www.uspto.gov/ebc/index.html or 1-866-217-9197 for information on this policy. Requests

to restart a period for response due to a missing U.S. patent or patent application publications will not be granted.

/(Vikki) Hoa B Trinh/
Examiner, Art Unit 2814